REMARKS

I. PRELIMINARY REMARKS

Claims 1, 3, 9, 14, 17 and 43 have been amended. Claims 44 and 45 have been added. Claim 5 has been canceled. Claims 1-4, 6-19, 21-23 and 43-45 remain in the application. Claims 3, 4 and 17 have been withdrawn from consideration. Reexamination and reconsideration of the application, as amended, are respectfully requested.

II. OBJECTION AND REJECTION UNDER 35 U.S.C. §§ 132 AND 112

The amendment filed June 13, 2006 has been objected to under 35 U.S.C. § 132 for purportedly introducing new matter into the specification. Claims 1, 2, 5-13 and 43 have been rejected under 35 U.S.C. § 112, first paragraph, as purportedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s), at the time the application was filed, has possession of the invention.

The objection and rejection are traversed because the application, as filed, did disclose reactant paths that are "in the form of an unobstructed gap." The objection and rejection have, however, been rendered moot because the claims, as amended, no longer include the "unobstructed gap" recitation. Nevertheless, in order to advance prosecution, the Section 112 support for amended claim 1 is discussed below.

Independent claim 1, as amended, indicates that the fuel path "extends more than once around the perimeter of the inner region and has an upstream end associated with the outer region and a downstream end associated with the inner region [of the associated housing]." Referring to the exemplary embodiment illustrated in Figures 9-13B, the exemplary fuel cell is shaped such that there is a fuel path (i.e. fuel passage 134) that extends more than once around the perimeter of the inner region of the housing 102.

Independent claim 1 also indicates that the fuel path is "in the form of an empty space that extends from an electrode surface to a radially spaced electrode surface."[1] Those of skill in the fuel cell art would have understood that a fuel cell includes two electrodes, an anode electrode and a cathode electrode. A fuel cell that is bent during manufacture in the manner illustrated in Figures 13A and 13B will have an "anode electrode surface to anode electrode surface" empty space. One example of such an empty space is illustrated in Figure 5, which is reproduced below. Note that there is nothing but empty space in the fuel passage 134 between the radially outer surface of inner-most portion of anode 118 (i.e. the portion on the left) and the radially inner surface of the next portion of the anode 118 (i.e. the middle portion). Alternatively, a fuel cell that is bent during manufacture in the manner illustrated in Figure 14 will have an "anode electrode surface to cathode electrode surface" empty space. Here, oxidant is combined with the fuel in the fuel/oxidant passage 135. One example of such an empty space is illustrated in Figure 15, which is reproduced below. Note that there is nothing but empty space in the fuel/oxidant passage 135 between the radially outer surface of anode 118 and the radially inner surface of the cathode 120.

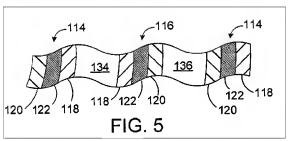

FIG. 5

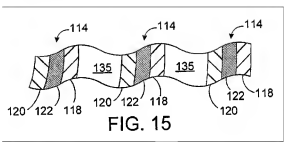

FIG. 15

[1] Although the specification does not include the exact phrase "an empty space," the "claimed subject matter need not be described *in haec verba* in the specification in order for that specification to satisfy the description requirement." *In re Smith and Hubin*, 178 USPQ 620, 624 (CCPA 1973). Rather, applicant need only convey to those skilled in the art that, as of the filing date sought, he or she was in possession of the claimed invention. "One does that by such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention." *Lockwood v. American Airlines, Inc.*, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

III. PRIOR ART REJECTIONS

A. The Rejections

Claims 1, 2, 5-7, 9, 12, 14-16, 18 19, 22 and 43 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,063,517 to Montemayor et al. ("the Montemayor '517 patent"). Claims 8, 11, 13 and 23 have been rejected under 35 U.S.C. § 103 as being unpatentable over the Montemayor '517 patent. Claims 10 and 21 have been rejected under 35 U.S.C. § 103 as being unpatentable over the combined teachings of the Montemayor '517 patent and U.S. Patent Pub. No. 2003/0011721 to Wattelet et al. ("the Wattelet '721 publication").

As claim 5 has been canceled, applicant respectfully submits that the rejection thereof under 35 U.S.C. § 102 has been rendered moot. The rejections of the remaining claims under 35 U.S.C. §§ 102 and 103 are respectfully traversed with respect to the claims as amended above. Reconsideration thereof is respectfully requested.

B. The Cited References

As illustrated in Figure 1, the Montemayor '517 patent discloses a fuel cell apparatus including a fuel cell with an anode 14 and hydrogen injection tubes 22 and 24 at the longitudinal edges of the anode. The fuel cell is rolled in the manner illustrated in Figure 2 and placed in the casing 30 illustrated in Figure 3. During operation, hydrogen is forced into both longitudinal ends of the anode 14 by way of the hydrogen injection tubes 22 and 24 under sufficient pressure to force the hydrogen through the anode. [Note arrows 34 in Figure 3.] Oxidant is supplied to the rolled fuel cell by way of the gaps adjacent to the cathode 26. Additionally, and although it is not entirely clear, it appears that hydrogen which was not forced into the anode 14 exits the apparatus by way of the injection tubes 22 and 24. [Note the arrows at the bottom of Figure 3.]

The Wattelet publication has been cited for its purported heat exchanger teachings.

C. Discussion Concerning Claims 1, 2, 6-13 and 43

Independent claim 1 is directed to a combination of elements comprising "a housing having an outer region and an inner region defining a perimeter" and "at least one spiral shaped fuel cell, including an anode electrode and a cathode electrode, that defines a fuel path." Claim 1 also indicates that "the fuel path extends more than once around the perimeter of the inner region and has an upstream end associated with the outer region and a downstream end associated with the inner region." Claim 1 further indicates that "the fuel path is in the form of ***an empty space that extends from an electrode surface to a radially spaced electrode surface***." The respective combinations defined by claims 2, 6-13 and 43 include, *inter alia*, the elements recited in claim 1.

The Montemayor '517 patent fails to teach or suggest the claimed combinations. For example, the Office Action appears to have taken the position that there are open regions within the Montemayor fuel catalyst 16/18 that define a "fuel path." [Office Action at page 7.] Even assuming that this is a reasonable interpretation of the Montemayor '517 patent, the purported fuel path is not an empty space that extends from a surface of the Montemayor anode 14 to a radially spaced surface of the anode 14. Referring to the reference numerals in Figure 1, when the Montemayor fuel cell is rolled in the manner illustrated in Figure 2 there is a layer of fuel catalyst 16, a portion of the PEM sleeve 12, a layer of oxygen catalyst 17, the cathode 26, another layer of oxygen catalyst 17, another portion of the PEM sleeve 12, and a layer of fuel catalyst 18 between radially spaced surfaces of the anode 14. The purported fuel path is also not an empty space that extends from a surface of the anode 14 to a radially spaced surface of the cathode 26. Referring to the reference numerals in Figure 1, when the Montemayor fuel cell is rolled in the manner illustrated in Figure 2 there is, at a minimum, a layer of fuel catalyst 18, a portion of the PEM sleeve 12, and a layer of oxygen catalyst 17 between radially spaced surfaces of the anode 14 and cathode 26.

As illustrated above, the Montemayor '517 patent fails to teach or suggest each and every element of the combination recited in independent claim 1. Applicant

respectfully submits, therefore, that claims 1, 2, 6, 7, 9, 12 and 43 are patentable thereover and that the rejection under 35 U.S.C. § 102 should be withdrawn.

Turning to claims 8, 11 and 13, applicant respectfully submits that the Montemayor '517 patent also fails to render independent claim 1 obvious and that claims 8, 11 and 13 are patentable over the Montemayor '517 patent for at least the same reasons as independent claim 1. The rejection of claims 8, 11 and 13 under 35 U.S.C. § 103 should, therefore, be withdrawn.

Finally, with respect to claim 10, the Wattelet '721 publication fails to remedy the above-identified deficiencies in the Montemayor '517 patent. Claim 10 is, therefore, patentable for at least the same reasons as independent claim 1 and the rejection of claim 10 under 35 U.S.C. § 103 should also be withdrawn.

D. Discussion Concerning Claims 14-16 and 18

Independent claim 14 is directed to a combination of elements comprising "a housing including an inlet and an exhaust port located radially inward of the inlet," "an exhaust region connected to the housing exhaust port" and "at least one anode and cathode arrangement having a spiral shape that extends outwardly of and more than once around the perimeter of the exhaust region and defines a reactant path having an outlet end associated with the exhaust region and an inlet end connected to the housing inlet." Claim 14 also indicates that "the housing and the anode and cathode arrangement are constructed and arranged relative to one another such that ***the only reactant flow direction is inward toward the housing exhaust port that is located radially inward of the housing inlet***." The respective combinations defined by claims 15, 16 and 18 include, *inter alia*, the elements recited in claim 14.

The Montemayor '517 patent fails to teach or suggest the claimed combinations. For example, and referring to Figures 2 and 3, the Montemayor '517 patent discloses a fuel cell apparatus including a casing 30, a fuel cell within the casing, and hydrogen injection tubes 22 and 24 that force hydrogen into the inner and outer ends of the fuel cell anode 14. [Note arrows 34 in Figure 3.] In contrast to the claimed combination, there is clearly some

flow that not ***inward toward a housing exhaust port that is located radially inward of the housing inlet***, as is evidenced by the arrow labeled 24 in Figure 3.

As illustrated above, the Montemayor '517 patent fails to teach or suggest each and every element of the combination recited in independent claim 14. Applicant respectfully submits, therefore, that claims 14-16 and 18 are patentable thereover and that the rejection under 35 U.S.C. § 102 should be withdrawn.

E. Discussion Concerning Claims 19 and 21-23

Independent claim 19 is directed to a combination of elements comprising "a housing having an outer region, an inner region defining a perimeter and exhaust port connected to the inner region" and "***means for*** converting reactants into electricity and byproducts and directing the reactants and byproducts from the outer region to the inner region, and at least once around the perimeter of the inner region, as the reactants are being converted into electricity and byproducts, ***such that all of the byproducts and any unused reactants*** that exit the fuel cell assembly exit by way of the inner region." The respective combinations defined by claims 21-23 include, *inter alia*, the elements recited in claim 19.

At the outset, applicant notes that the independent claim 19 includes a means-plus-function element. The MPEP requires a two-part analysis of means-plus-function elements. ***First***, "the application of a prior art reference to a means or step plus function limitation ***requires*** that the prior art element ***perform the identical function*** specified in the claim." [MPEP § 2182, emphasis added.] Second, "***if a prior art reference teaches identity of function*** to that specified in a claim, ***then*** under Donaldson an examiner carries the initial burden of proof for showing that the prior art structure or step is the same as or equivalent to the structure, material, or acts described in the specification which has been identified as corresponding to the claimed means or step plus function." [Id., emphasis added.] Along these lines, the Federal Circuit stated that "[t]he corresponding structure to a function set forth in a means-plus-function limitation ***must actually perform the recited function, not merely enable the pertinent***

structure to operate as intended." *Asyst Technologies Inc. v. Empak Inc.*, 60 USPQ2d 1567, 1672-73 (Fed. Cir. 2001), emphasis added. With respect to the function itself, it is well settled that ***all functional statements*** which follow the "means for" language must be considered. See, e.g., *Sage Products Inc. v. Devon Industries Inc.*, 44 USPQ2d 1103, 1110 (Fed. Cir. 1997).

The Montemayor '517 patent fails to teach or suggest the claimed combinations. For example, the function recited in the means-plus-function element is not being performed because what appears to be unused hydrogen exits the Montemayor apparatus from the ***outer region (tube 24)*** in addition to the inner region (tube 22). [Figure 3.] Faced with this clear difference between the claimed invention and the cited reference, the Office Action indicated that "the Examiner is not relying on the arrow 24 to meet above claim limitation and thus, is irrelevant to the issue." [Office Action at page 8.] The Examiner's assertion that she can simply ignore "inconvenient" portions of the Montemayor device when evaluating a claim which requires that "***ALL*** of the byproducts and ***ANY*** unused reactants that exit the fuel cell" to exit in a particular manner is utterly without merit.

As illustrated above, the Montemayor '517 patent fails to teach or suggest each and every element of the combination recited in independent claim 19. Applicant respectfully submits, therefore, that claims 19 and 22 are patentable thereover and that the rejection under 35 U.S.C. § 102 should be withdrawn. As the Montemayor '517 patent also fails to render independent claim 19 obvious, the rejection of dependent claim 23 under 35 U.S.C. § 103 should also be withdrawn.

Turning to claim 21, the Wattelet '721 publication fails to remedy the above-identified deficiencies in the Montemayor '517 patent. Claim 21 is, therefore, patentable for at least the same reasons as independent claim 19 and the rejection of claim 21 under 35 U.S.C. § 103 should also be withdrawn.

IV. NEWLY PRESENTED CLAIMS

Newly presented claims 44 and 45 depend from claim 1 and are patentable for at least the same reasons as claim 1.

V. CLOSING REMARKS

In view of the foregoing, it is respectfully submitted that the claims in the application are in condition for allowance. Reexamination and reconsideration of the application, as amended, are respectfully requested. Allowance of the claims at an early date is courteously solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is respectfully requested to call applicant's undersigned representative at (310) 563-1458 to discuss the steps necessary for placing the application in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2025. Should such fees be associated with an extension of time, applicant respectfully requests that this paper be considered a petition therefor.

Respectfully submitted,

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Date

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